

b3 direction at least a substantial extent, and also extending in the longitudinal direction of the actuator body (1).

REMARKS

Claims 11-31 remain in the application.

Claims 14 has been indicated as allowable, and such indication is appreciated. Claim 14 has been rewritten to include the limitations of claims 11 and 13 and place it in independent form.

In paragraph 2 of the Office action the examiner has rejected claims 20 and 27-31 as being indefinite. Changes have been made to correct the deficiencies noted by the examiner.

In paragraph 4 of the Office action, the examiner has rejected claims 15-19 and 21-26 under 35 USC 103 as unpatentable over Mochizuki et al (JP 08-306979). With regard to this rejection, it is believed that the examiner has misread the reference to Mochizuki et al in that in Mochizuki et al, the attempt is not to avoid contact with the "second electrode connection" by means of the recess in the first electrode layer, but rather, by this recess, to avoid contact with the second electrode contact layer.

This structure of Mochizuki et al forces an inefficient operation of the piezoelectric stack, in that, for each first

conducting layer to avoid contacting the adjacent second conducting layer, large spaces, or gaps are required between the electrodes. These gaps cause areas where the piezoelectric layers do not have solid backing material and thus cannot push against each other efficiently.

As opposed to this, in applicants' structure the contacts 10 and 11 can fill almost all of the space between the piezoelectric layers, giving a much more efficient piezoelectric stack with overall smaller dimensions to give the same travel and force as a larger stack designed with the structure taught by Mochizuki et al.

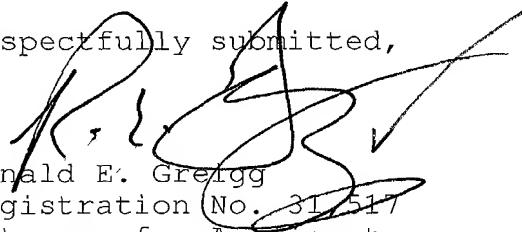
Moreover, in figure 10 of Mochizuki et al, it appears that the first electrode connection 7a is not placed on the inside surface of a cylinder, but rather connection 7a appears planar and contacts first electrode layer at the end of the stack of the piezoelectric layers, and from there on each first electrode layer contacts the next first electrode layer. Likewise, it appears that the second electrode connection 8a is planar and not placed on the inside surface of a cylinder. Second electrode connection 8a contacts the second electrode layer at the other end of the stack of the piezoelectric layers, and from there on each second electrode layer contacts the next second electrode layer. This is in opposition to applicants' structure where the first and second electrode

connections 12 and 13 are placed on the inside surfaces of the cylindrical housing for the piezoelectric stack. This provides an opportunity for a better, and more robust connection from the piezoelectric stack to the outside world.

This also allows for a more efficient piezoelectric stack in that more of the surfaces of the piezoelectric layers are in direct contact with solid material to push against.

Entry of the amendment and allowance of the claims is respectfully submitted.

Respectfully submitted,



Ronald E. Greigg  
Registration No. 31517  
Attorney for Applicant  
Customer Number 002119

October 31, 2001

Greigg & Greigg P.L.L.C.  
1423 Powhatan Street  
Unit One  
Alexandria, Virginia 22314  
Telephone: 703-838-5500  
Facsimile: 703-838-5554

REG:SLS